UNIFORM STANDARD SPECIFICATIONS for PUBLIC WORKS CONSTRUCTION

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1998
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(Includes revisions through 2002)

FOREWORD

Publication of these Uniform Standard Specifications for Public Works Construction fulfills the goal of a group of agencies who joined forces in 1966 to produce such a set of documents. Subsequently, in the interest of promoting county-wide acceptance and use of these standards, the Maricopa Association of Governments accepted their sponsorship and the responsibility of keeping them current and viable.

These specifications, representing the best professional thinking of representatives of several Public Works Departments, reviewed and refined by members of the construction industry, were written to fulfill the need for uniform rules governing public works construction performed for Maricopa County and the various cities and public agencies in the county. It further fulfills the need for adequate standards by the smaller communities and agencies who could not afford to promulgate such standards for themselves.

A uniform set of specifications, updated and embracing the most modern materials and construction techniques will redound to the benefit of the public and the private contracting industry. Uniform specifications will eliminate conflicts and confusion, lower construction costs, and encourage more competitive bidding by private contractors.

The Uniform Standard Specifications for Public Works Construction will be revised periodically and reprinted to reflect advanced thinking and the changing technology of the construction industry. To this end a specifications committee has been established as a permanent organization to continually study and recommend changes to the specifications. Interested parties may address suggested changes and questions to:

Standard Specifications & Details Committee c/o Maricopa Association of Governments 302 North 1st Avenue, Suite 300 Phoenix, Arizona, 85003.

These suggestions will be reviewed by the committee and appropriate segments of the industry and cumulative annual revisions will be published the first of each year.

While in the interest of uniformity, it is hoped that all using agencies will adopt these standards with as few changes as possible, it is recognized that because of charter requirements and for other reasons, some agencies will find it necessary to modify or supplement certain requirements.

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- (A) If the pavement cuts (bore pits, recovery pits, etc.) are 300 feet or more apart, the bore or tunneled distance will not be considered as part of the open trench and the seal coat may not be required.
- (B) If the pavement cuts (bore pits, recovery pits, etc.) are less than 300 feet apart, the distance between the cuts will be considered the same as a trench cut and the distance will be added to any trench cut distances.
- **336.2.3 Temporary Pavement Replacement:** Temporary pavement replacement, as required in Section 601, may be with cold-mix asphalt concrete, with a minimum thickness of 2 inches, using aggregate grading in accordance with Section 710.

Temporary pavement replacement shall be used in lieu of immediate placement of single course permanent replacement or the first course of two course pavement replacement only on transverse lines such as spur connections to inlets, driveways, road crossings, etc., when required by the Engineer, by utilities or others who subcontract their permanent pavement replacement, under special prior arrangement; or for emergency conditions where it may be required by the Engineer. Temporary pavement replacement shall be placed during the same shift in which the backfill to be covered is completed.

Rolling of the temporary pavement replacement shall conform to the following:

- (A) Initial or breakdown rolling shall be followed by rolling with a pneumatic-tired roller. Final compaction and finish rolling shall be done by means of a tandem power roller.
- (B) On small areas or where equipment specified above is not available or is impractical, the Engineer will approve the use of small vibrating rollers or vibrating plate type compactors provided comparable compaction is obtained.

The surface of the temporary pavement shall be finished off flush with the adjacent pavement.

336.2.4 Permanent Pavement Replacement and Adjustments:

3362.4.1: Permanent Pavement Replacement: Pavement replacement for cuts essentially parallel to the street centerline and greater than 50 feet in length shall be two course pavement replacement as hereinafter specified. For cuts greater than 600 feet in length the entire area shall then be seal coated in accordance with Section 330 (coated chips) or as otherwise specified. This seal coat shall extend from the edge of pavement or lip of gutter to the street centerline except that on residential streets less than 36 feet face to face of curb or where the pavement patch straddles the centerline, the entire width of street shall be seal coated.

In lieu of placing the seal coat as required previously, and with approval of the Contracting Agency, the Contractor may deposit with the Contracting Agency for credit to the Street Maintenance Department, a negotiated agreed upon amount. The Street Maintenance Department will incorporate this work into their street maintenance program.

Pavement replacement for cuts parallel to the street centerline less than 50 feet in length, transverse cuts, bell holes and similar small areas shall match gradation and thickness of the existing pavement. These one course pavement patches shall be compacted with a vibratory roller to the same density specified for asphalt concrete pavements.

Laying of single course or the base course of the asphalt concrete pavement replacement where a two course replacement is applicable shall never be more than 600 feet behind the ABC placed for the pavement replacement.

The trench must be compacted to its required density, and required ABC must be in place prior to the placement of the asphalt concrete.

Single course replacement shall consist of a 12.5 mm or 19 mm mix placed and finished as directed by the Engineer.

The base course of two course pavement replacement shall consist of a 19 mm mix in accordance with Section 710.

Where the base course is to be placed with non-compactive equipment, it shall be not less than 2 inches in thickness and the material shall be immediately rolled with a pneumatic-tired roller. The surface course shall be of sufficient depth to provide the total required compacted thickness of the two courses, but not more than 1 inch.

Where the trench is 6 feet or more in width, all courses, single or both courses of the two course pavement replacement, shall be laid with a self-propelled compacting, spreading equipment. When the trench is from 6 to 8 feet in width, the self-propelled compacting, spreading equipment shall not be wider than 8 feet. All courses, except the surface course, shall be of a compacted thickness of not less than 1½ inches.

The surface course shall consist of a 9.5 mm mix in accordance with Section 710 as specified by the Engineer to match the existing surface. The surface course shall not be placed sooner than 2 weeks after the base course, except where the trench crosses a signalized intersection. In this case the surface course shall be placed within 48 hours, or the crossing pavement replacement shall be single course as specified above.

Placement of the surface course is to be by means which will result in a surface texture satisfactory to the Engineer, and flush with the existing pavement.

Where deep lift asphalt concrete (asphalt concrete base and asphalt concrete wearing course) exists, the base course replacement shall be made in lifts not exceeding 6 inches in compacted thickness to within ½ inch of the finish grade.

336.2.4.2 Adjustments: When new or existing manholes, valves, survey monuments, clean outs, etc. fall within the limits of the permanent pavement replacement as discussed in this Section, the Contractor shall be responsible for adjusting the various items to the new pavement surface or as directed by the Engineer. This will include but not be limited to slurry and chip seals.

The Contractor will coordinate with the Engineer and with representatives of the various utilities regarding the adjustment and inspection of the work. The Contractor shall be responsible for obtaining and complying with all specifications, special requirements, details, etc. of the Utility Company regarding the adjustments. When adjusting the Agency's utilities, survey monuments, etc., the adjustment will comply with these Specifications and Details.

The work will be done in compliance with OSHA standards and regulations regarding confined space entry.

The Contractor shall remove all material attached to the lids and/or covers including that of prior work. The method of removal shall be approved by the Engineer and/or the Utility Representative.

336.3 TYPES AND LOCATIONS OF PAVEMENT AND SURFACING REPLACEMENT:

Normally, the type of pavement replacement and backfill required will be noted on the plans or specified in other portions of the contract documents and construction will be in accordance with Detail 200. This detail requires that a 12-inch "T" Top be utilized when normal traffic flow is perpendicular to any one of the four sides of the trench excavation. Therefore, Type A pavement replacement will require a "T" Top whenever the trench crosses a street or goes through an intersection and at the end(s) if they terminate in the street. Type B pavement replacement will require the "T" Top on the sides that are perpendicular to normal traffic flow.

If a type is not noted on the plans or specified in the special provisions, the following criteria will govern:

Type A pavement replacement, including the "T" Top, will be utilized on all streets where the excavation is parallel to the centerline of the street.

Type B pavement replacement, including the "T" Top, will be utilized on all streets where the excavation is transverse to the centerline of the street.

Type C pavement replacement will be used to match existing portland cement concrete pavement.

Type D pavement replacement may be used when the condition of the existing pavement does not justify construction of Type A or B. Prior written approval of the Engineer is required.

Type F pavement replacement will be utilized to match existing ABC or decomposed granite roadways.

Where a longitudinal trench is partly in pavement, the pavement shall be replaced to the outside edge of the existing pavement, on a straight line, as indicated on the plans. Measurements for payment shall be from the inner limit of pay width allowed below, to the outside edge of the existing pavement as defined herein.

Where no part of a trench is in pavement, surfacing replacement will only be specified where existing surfacing materials have been removed.

When a trench cut is in aggregate surfaced area, the surfacing replacement shall be of a like type and depth as the existing material, compacted to the densities required in Section 601.

336.4 Measurement:

Measurement for payment and surfacing replacement shall be by the square yard, based upon actual field measurement of the area covered except as noted below.

- (A) In computing pay quantities for replacement Types A, B, and F, pay widths will be based on the actual field measured width, however the boundaries of the measurement will not extend further than 1/2 the distance, either side, from the centerline of the pipe as depicted on Table 601-1, Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel.
- (B) In computing pay quantities for replacement Types C, D, E, and T, pay widths will be based on the actual field measured width, however the boundaries of the measurement will not extend further than 1/2 the distance plus 12 inches, either side, from the centerline of the pipe as depicted on Table 601-1, Maximum Width At Top Of Pipe Greater Than O.D. Of Barrel.
- (C) Where a longitudinal trench is partly in pavement, computations of pay quantities shall be based on the limitations specified above.
- (D) The length of pavement and surfacing replacement shall be measured through any manhole, valve box, or other structure constructed in the pipe line, and any pavement or surface replacement and/or seal treatment in excess of the above pay widths shall be considered and included in the bid item for such structure.
- (E) Any pavement replacement in excess of the specified pay widths necessitated by the installation of valves, tapping sleeves and valves, valve by-passes, and concrete thrust blocks shall be included in the bid price for these items.
- (F) When special provisions allow deviations from the trench widths specified in Section 601, the above allowed pay widths for pavement replacement may be altered where so specified.
- (G) Measurement of pavement and surfacing replacement shall be made along the finished surface of the ground to the nearest foot, and shall be computed to the nearest square yard.

336.5 PAYMENT:

Direct payment for pavement or surfacing replacement will be made for replacement over all pipe trench cuts except as otherwise allowed in the special provisions. Payment for replacements over other work shall be included in the cost of constructing that work, in accordance with the applicable standard details and specifications.

Payment for temporary pavement replacement shall be included in the cost of the pipe.

When a Contractor has the option of either jacking and/or boring or opencut construction, and elects to construct a pipeline by the jacking and/or boring method, he will be paid for the replacement of such items of work as pavement, curb and gutter, sidewalk, driveway, and alley entrances, as allowed for opencut construction.

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CONCRETE CURB, GUTTER, SIDEWALK, SIDEWALK RAMPS, DRIVEWAY AND ALLEY ENTRANCE

340.1 DESCRIPTION:

The various types of concrete curb, gutter, sidewalk, sidewalk ramps, driveways, and alley intersections shall be constructed to the dimensions indicated on the plans and standard detail drawings. Joints shall be designated as expansion joints or contraction joints and shall be constructed as per Subsection 340.3.

340.2 MATERIALS:

Concrete shall be class B, conforming to the applicable requirements of Section 725.

Expansion joints filler shall comply with Section 729.

340.3 CONSTRUCTION METHODS:

Existing pavements and concrete, that are joined by new construction, shall be cut in accordance with Section 601.

The subgrade shall be constructed and compacted true to grades and lines shown on the plans and as specified in Section 301. All soft or unsuitable material shall be removed to a depth of not less than 6 inches below subgrade elevation and replaced with material satisfactory to the Engineer. When the Engineer determines that the existing subgrade consists of soils with swelling characteristics, the moisture content shall be brought as close as possible to the optimum required for compaction. This shall be done by the addition of water, by the addition and blending of dry suitable material or by the drying of existing material. The subgrade shall then be compacted to a relative density of 75% minimum to 85% maximum with 80% as ideal.

Material displaced in the construction shall not be placed on the base and/or surfacing material already in place on the roadway nor shall the excavated material be placed in such a manner as to interfere with access to property or traffic flow in the street.

Existing concrete sidewalks and driveways which abut the new sidewalks and driveway entrances shall be removed to a distance required to maintain a slope as indicated by standard details or not to exceed 1 inch per foot where sidewalks are concerned. Sawcutting is required at the match lines and payment will be made under the respective pay items as provided in the proposal.

Concrete curbs, gutters and sidewalks shall be constructed by the conventional use of forms, or may be constructed by means of an appropriate machine when approved by the Engineer.

If machines designed specifically for such work and approved by the Engineer are used, the results must be equal to or better than that produced by the use of forms. If the results are not satisfactory to the Engineer, the use of the machine shall be discontinued and the Contractor shall make necessary repairs at his own expense. All applicable requirements of construction by use of forms shall apply to the use of machines.

Forms conforming to the dimensions of the curb, gutter, sidewalk, sidewalk ramps, driveway, and alley entrance shall be carefully set to line and grade, and securely staked in position. The forms and subgrade shall be watered immediately in advance of placing concrete.

Forms shall be thoroughly cleaned each time they are used, and shall be coated with a light oil, or other releasing agent of a type which will not discolor the concrete.

The concrete shall be thoroughly spaded away from the forms so that there will be no rock pockets next to the forms. The concrete may be compacted by mechanical vibrators approved by the Engineer. Tamping or vibrating shall continue until the mortar flushes to the surface, and the coarse aggregate is below the concrete surface.

ADJUSTING FRAMES. COVERS. VALVE BOXES AND WATER METER BOXES

345.1 DESCRIPTION:

The Contractor shall furnish all labor, materials, and equipment necessary to adjust all frames, covers and valve boxes as indicated on the plans or as designated by the Engineer. The frames shall be set to grades established by the Engineer, in a manner hereinafter specified.

The Contractor may elect to remove old frames, covers and valve boxes and to install new frames and/or boxes without any additional cost to the Contracting Agency, in accordance with standard detail drawings.

345.2 ADJUSTING FRAMES:

The Contractor shall loosen frames in such a manner that existing monuments, clean outs or valve boxes will not be disturbed or manholes damaged. Debris shall not be permitted to enter sanitary or storm sewer conduits. All loose material and debris shall be removed from the excavation and the interiors of structures prior to resetting frames.

Frames shall be set to the elevations and slopes established by the Engineer and shall be firmly blocked in place with masonry or metal supports. Spaces between the frame and the old seat shall be sealed on the inside to prevent any concrete from entering the hand hole or manhole. Class AA concrete shall be placed around and under the frames to provide a seal and properly seat the frame at the required elevation and slope. Concrete shall be struck off flush with the top of the existing pavement.

Adjusting rings may be used to raise manhole rings and covers in asphalt pavements when deemed acceptable by the Engineer. The rings shall be approved by the Engineer.

The amount of adjustment, thickness of seal or overlay, and cross slope will be considered when using adjusting rings. Each location where an adjusting ring is used must have a sufficient depth of asphalt to assure the proper installation and operation of the ring. The rings shall be made of a non-metallic, polypropylene or fiberglass material and installed per the manufacturer's specifications.

345.3 ADJUSTING VALVE BOXES:

Valve boxes shall be adjusted to the new elevations indicated on the plans, or as established by the Engineer.

Adjustable cast iron boxes shall, if possible, be brought to grade by adjustment of the upper movable section. Any excavated area shall be filled with Class AA concrete to the level of the existing pavement, or as directed by the Engineer.

Concrete pipe valve boxes in areas not subject to vehicular traffic shall be adjusted to grades by installing a suitable length of metal or concrete pipe, of the same inside diameter as the present valve box, and reinforcing the outside with a concrete collar extending from at least 2 inches below the joint up to and flush with the top of the valve box extension. This collar shall be of Class AA concrete. The dimension from the outside of the box to the outside of the collar shall not be less than 2 inches. This adjustment will be known as Type B.

In areas subject to vehicular traffic and where the existing valve box is a Type B, the adjustment to the new elevation shall be made using the old cover and installing a new 8 inch frame in accordance with the standard detail for installation of valve boxes in vehicular traffic areas. This adjustment shall be known as Type BA.

Adjustment of existing Type A valve boxes to the new elevations shall be as described in Subsection 345.2 above. This adjustment shall be known as Type A.

345.4 MEASUREMENT:

The quantities measured will be the actual number of frames, covers and valve boxes of each type, adjusted and accepted.

345.5 PAYMENT:

The quantities, as determined above will be paid for at the contract price per unit of measurement respectively, for each of the particular items listed in the proposal. The payment shall be compensation in full for all materials, labor, equipment and incidentals necessary to complete the work.

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REMOVAL OF EXISTING IMPROVEMENTS

350.1 DESCRIPTION:

This work shall consist of removal and disposal of various existing improvements, such as pavements, structures, pipes, curbs and gutters, and other items necessary for the accomplishment of the improvement.

350.2 CONSTRUCTION METHODS:

The removal of existing improvements shall be conducted in such a manner as not to injure utilities or any portion of the improvement that is to remain in place. See Section 107.

Sidewalks shall be removed to a distance required to maintain a maximum slope for the replaced portion of sidewalk, for one inch per foot and all driveways shall be removed to a distance as required by standard details.

Existing concrete driveway curbs and gutters shall be removed to the right-of-way line and the new end of curb faced.

Portland cement concrete pavements, curbs and gutters and sidewalks designated on the plans for removal shall be saw-cut at match lines, in accordance with Section 601 and removed.

Asphalt concrete pavements designated on the plans for removal shall be cut in accordance with Section 336.

Removal of trees, stumps, irrigation structures, storm water inlets, headwalls and other items in the right-of-way shall be done in accordance with Section 201.

Backfill and compaction of all excavated areas shall be compacted to the densities as prescribed in Section 601.

All surplus materials shall be immediately hauled from the jobsite and disposed of in accordance with Section 205.

350.3 MISCELLANEOUS REMOVAL AND OTHER WORK:

This work shall include, but not be limited to the following, where called for on the plans.

- (A) Relocate existing fence and gate.
- (B) Remove and reset mail boxes.
- (C) Remove signs and bases in right-of-way.
- (D) Remove planter boxes, block walls, concrete walls, and footings.
- (E) Install plugs for pipes and remove existing plugs as necessary for new construction.
- (F) Remove wooden and concrete bridges.
- (G) Remove median island slabs.
- (H) Remove pavements and aggregate base where called for outside the roadway prism.

350.4 PAYMENT:

Payment for removals will be made at the unit bid prices bid in the applicable proposal pay items, which price shall be full compensation for the item complete, as described herein or on the plans.

RECLAIMED WATER LINE CONSTRUCTION

616.1 GENERAL:

This specification prescribes standards for utility water mains for the purpose of conveying, under pressure, reclaimed water for permitted reuse. Installation of reclaimed water mains shall be constructed in accordance with these specifications for materials, installation, and identification.

616.2 MATERIALS:

Pipe materials shall be in accordance with Section 610.

Valves shall be in accordance with Sections 610 and 630.

Valve boxes shall be in accordance with Section 345, this Section and Detail 391. Manholes shall be in accordance with Section 625, 787 and this Section, and applicable Details.

616.3 INSTALLATION:

Pipe shall be installed in accordance with Sections 601, 610, and this Section.

Valves and risers shall be installed in accordance with this Section.

Valve box debris caps shall be installed in accordance with this Section and Detail 392.

When a reclaimed water main is adjacent to or crosses a potable water main, the reclaimed water main shall be considered a pressure or force sanitary sewer and comply with Detail 404 for separation and/or protection. When a reclaimed water main is adjacent to or crosses a gravity, pressure or force sanitary sewer, the reclaimed water main shall be considered a potable water main and comply to Detail 404 for separation and/or protection.

616.4 IDENTIFICATION:

The color purple shall be used for identifying all pipes, valves, and other equipment used for conveying reclaimed water.

Reclaimed water identification tape shall be an inert polyethylene plastic impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil. The tape shall be a minimum of 4.0 mils thick and no less than 3"wide. The tape shall be purple and shall have the words, "CAUTION: RECLAIMED WATER LINE" or similar wording printed in black lettering continuously along the entire length. Lettering shall be a minimum 1½ inches high. Spacing between the individual words of the message shall not exceed three inches.

Reclaimed water identification sleeving (pipe socks) shall be an inert polyethylene plastic that is impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil. The sleeving shall be a minimum of 4.0 mils thick. The sleeving shall be purple and shall have the words, "CAUTION: RECLAIMED WATER LINE" or similar wording printed in black lettering continuously along the entire length. Lettering shall be a minimum $1\frac{1}{2}$ inches high. Spacing between the individual words of the message shall not exceed three inches.

Reclaimed water identification decals shall be made of inert material resistant to cracking, peeling, and fading due to sunlight and heat. Decals shall have an aggressive adhesive to ensure permanent bonding to the surface that is being identified. The decals shall have the words, "CAUTION: RECLAIMED WATER - DO NOT DRINK" or similar wording printed in black lettering on a purple background. Lettering shall be a minimum 1-inch high. Spacing between the individual words of the message shall not exceed three inches.

Reclaimed water pipe identified by stenciling shall use paint or ink resistive to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil. Stenciled pipe shall have the words, "CAUTION: RECLAIMED WATER - DO NOT DRINK" or similar wording printed in black or white lettering on a purple background continuously along the entire length.

Lettering shall be a minimum of $1\frac{1}{2}$ high. Lettering shall be placed on a painted purple band a minimum of 3-inches wide that runs the entire length of the pipe.

Reclaimed water locating tape shall be an inert polyethylene plastic that is impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil. The tape shall be a minimum of 4.0 mils thick, 3" wide and contain a minimum thickness of 1/3 mil metallic foil or two embedded copper wires. The tape shall be purple and printed with the words, "CAUTION: RECLAIMED WATER LINE BELOW" or similar wordings printed in black lettering continuously along the entire length. Lettering shall be a minimum 1½ inches high. Spacing between the individual words of the message shall not exceed three inches.

Integral colored reclaimed water pipe shall be purple in color and shall have the words, "CAUTION: RECLAIMED WATER-DO NOT DRINK" or similar wording printed in black lettering at intervals no greater than 3 feet. Lettering shall be a minimum 1½ inches high. Spacing between the individual words of the message shall not exceed three inches.

Reclaimed water valve tags shall be inert polyethylene plastic that is impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil. The tags shall be purple and shall have the words, "CAUTION: RECLAIMED WATER-DO NOT DRINK" or similar wording printed in black lettering. The lettering shall be a minimum of ½ inch high.

616.4.1 Below Ground Pipe:

(A) All below-ground reclaimed water pipelines shall be marked by identification tape, or sleeving, or integral coloring, or stenciling in conformance with this Section.

Identification tape shall be installed parallel to the centerline and on top of the pipe. The identification tape shall be installed continuously for the entire length of the pipe and shall be securely fastened with plastic adhesive tape banded around both the pipe and identification tape at no more than 4-foot intervals.

Identification sleeving shall be installed so the wording runs along the top of the pipe. Care shall be exercised to avoid displacement of sock and to ensure its integrity.

Stenciled pipe shall be installed so the wording is parallel to the centerline and on top of the pipe.

(B) The Agency will need to maintain adequate records, install locating devices, conduct surveys, etc. to be capable of locating all below-ground reclaimed water mains as required by ARS 40-360. The means for locating the mains shall be at the discretion of the Agency. When locating tape is used, the tape shall be installed with the printed side up, directly above the pipe, parallel to the centerline, and buried 24 inches below the finished surface grade. The backfill shall be sufficiently leveled so that the tape is installed on a flat surface. Care shall be exercised to avoid displacement of the tape and to ensure its integrity.

In lieu of locating tape, a locating wire can be fastened by plastic adhesive tape to the top center of the pipe. The adhesive tape shall be banded around both the pipe and wire at no more than 4 foot intervals. The wire shall be continuous for the entire length of the pipe, without gaps, breaks, etc. The wire shall terminate above ground in a valve riser housing.

616.4.2 Above-Ground Pipe:

All above ground pipe shall be identified by stenciling or decals in conformance to this Section.

Stenciled pipe shall be installed so that the wording runs along both sides of the pipe.

Identification decals shall be placed on both sides of the pipe at intervals no greater than 3 feet. Surfaces shall be prepared to ensure proper adhesion of the decals.

616.4.3 Valves and Risers:

Valve handles shall be affixed with tags in accordance with this Section. Tags shall be securely fastened in a manner that ensures their visibility.

Riser pipes shall be painted purple both inside and out from the top of the pipe to at least one foot below the finished grade.

Debris caps shall be required in all valve housings per Detail 392 and shall be colored purple and affixed with tags in accordance with this Section. Tags shall be securely fastened in a manner that ensures their visibility.

616.4.4 Valve and Manhole Covers:

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PART 700

MATERIALS

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CONCRETE PRESSURE PIPE - STEEL CYLINDER TYPE

758.1 GENERAL:

These specifications apply to Concrete Pressure Pipe intended for use in water supply pipelines that carry water under pressure. Concrete pressure pipe is specified as follows:

(A) Reinforced concrete pressure pipe-steel cylinder type, pretensioned, shall be designed, manufactured and tested in accordance with AWWA C-303.

Reinforced concrete pressure pipe may be furnished in pipe diameters of sixteen (16) inches through forty-two (42) inches.

Pipe shall be designed by the methods described in Appendix A, AWWA C-303 to resist the internal pressures and external loading conditions designated on the approved plans or in the project specifications.

(B) Prestressed concrete pressure pipe steel cylinder type, shall be designed, manufactured and tested in accordance with AWWA C-301 and AWWA C-304.

Prestressed concrete pressure pipe may be furnished in pipe diameters forty-two (42) inches and larger.

Pipe shall be designed by the methods described in AWWA C-304 to resist the internal pressures and external loading conditions designated on the approved plans or in the project specifications.

758.2 MANUFACTURE:

The Contractor shall submit design calculations, a tabulated layout schedule, and details of specials and fittings to the Engineer for review and approval.

When specified in the project specifications, the manufacturer shall furnish all samples, test reports, test specimens and perform tests as provided in AWWA C-303 or AWWA C-301.

An approved rust inhibitor shall be applied on the exposed portions of the steel joint rings.

The Contractor shall submit an affidavit of compliance from the manufacturer that the pipe and fittings furnished comply with all applicable provisions of AWWA C-301 or AWWA C-303.

The Engineer or his representative shall be allowed access to the manufacturer's plant for the purpose of inspecting the pipe and fittings.

| d of Section — |
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STEEL PIPE

759.1 GENERAL:

These specifications apply to Steel pipe intended for use in water supply pipelines that carry water under pressure. Steel pipe is specified as follows:

Steel pipe shall be designed, manufactured and tested in accordance with AWWA C-200.

Steel pipe and fittings may be furnished in pipe diameters of six (6) inches and larger.

Pipe shall be designed by the methods described in AWWA C-200 and AWWA Manual M11, to resist the internal pressures and external loading conditions designated on the approved plans or in the project specifications.

Trench excavation, backfilling and compaction shall be in accordance with Section 601 unless otherwise specified in the plans and specifications. For Steel Pipe with a flexible coating the backfill pipe zone material shall consist of Granular Material, maximum 3/4" size

As an option, the backfill in the pipe zone may be Controlled low strength material (CLSM) in accordance with Section 728 and placement per Section 604.

759.2 LINING AND COATING OPTIONS:

- (A) Cement mortar lining and cement mortar coating shall be in accordance with AWWA C-205.
- (B) Polyurethane coatings for interior and exterior of steel pipe shall be in accordance with AWWA C-222. The MDFT shall be 20 mils. on the interior lining and 25 mils. on the exterior coating.
- (C) Polyethylene tape coating shall be in accordance with AWWA C-214. The total thickness of the tape coating shall be minimum 50 mils for pipe up to 54" diameter and minimum 80 mils for pipe 54" diameter and larger.
- (D) Liquid-Epoxy coating systems for the interior and exterior of steel water pipelines shall be in accordance with AWWA C-210. Interior lining will be applied in one or two coats MDFT of 16 mils.

All linings for potable waterlines shall be NSF approved.

759.3 MANUFACTURE:

The contractor shall submit design calculations, a tabulated layout schedule, and details of specials and fittings to the Engineer for review and approval.

When specified in the project specifications, the manufacturer shall furnish all samples, test reports, test specimens and perform tests as provided in AWWA C-200 or AWWA Manual M11.

Standard pipe shall be furnished with rolled-groove bell and spigot rubber gasket joints. Restrained joints shall be lap-welded slip joints with the bell formed by cold formed expanded dies.

Unless otherwise specified, fabricated steel pipe shall be manufactured in uniform lengths to fit the pipeline alignment shown on the plans, subject to a maximum length of 40 feet. For Steel Pipe with flexible coatings the pipe length may be 60 foot maximum, subject to the Manufacturer's recommendations. Shorter lengths may be furnished to facilitate special conditions.

The Contractor shall submit an affidavit of compliance from the manufacturer that the pipe and fittings furnished comply with all applicable provisions of AWWA C-200 or AWWA Manual M11.

The Engineer or his representative shall be allowed access to the manufacturer's plant for the purpose of inspecting the pipe and fittings.

End of Section

COATING CORRUGATED METAL PIPE AND ARCHES

760.1 GENERAL:

Corrugated metal pipe, pipe arches, and connectors to be used or furnished under this specification shall be manufactured and inspected in conformance with the requirements of AASHTO M-36, and as hereinafter specified. The size, type, and wall thickness of the pipe to be furnished shall be as specified on the project plans or specifications.

760.2 MATERIALS:

Corrugated metal products covered by this specification shall be plain galvanized conforming to the requirements of AASHTO M-36 as modified herein.

The types of bituminous coated pipe shall be as specified by the standard details or special provisions. In addition to the types listed in AASHTO M-190, there will be Type E.

Type E Pipe - Corrugated Metal Pipe with Smooth Metal Liner: The pipe shall be manufactured as per AASHTO M-36, Type 1A except that the lock seam shall be on the tangent of the helical corrugation. The ends of each pipe shall be reformed with two annular corrugations for joining the pipes with approved band couplers. The minimum thickness of the pipe shell shall be as required to support external load with no credit for load carrying support given to the liner. The minimum thickness for the liner shall be 22 gauge (0.034 inches).

760.3 BASE METAL, SPELTER AND FABRICATION:

The nominal pipe diameter shall meet the tolerances of this specification. Elliptical pipe, when specified, shall be shaped after fabrication and coating have been completed.

Helically Corrugated Metal Pipe: The pipe shall be fabricated from flat sheets in coils. The base metal, spelter coating, method of sampling, accepted brands of metal, sheet manufacturer's certified analysis and guarantee, workmanship, marking, inspection and rejection, shall meet the requirements of AASHTO M-36. Structures furnished shall be either full circle, or pipe-arch in accordance with Table 4 of AASHTO M-36, or other shape as shown on the plans. The pipe dimensions shall conform to AASHTO M-36 in all respects, except that the corrugations shall be helical instead of annular. The thickness of the galvanized metal shall be in accordance with project plans or specifications as otherwise specified. Pipe with helical corrugations shall have a continuous lock or weld seam extending from end to end of each length of pipe. The seams shall be fabricated in such a manner that they will not affect the shape or nominal diameter of the pipe and so that they will not create an element of weakness in the pipe.

Spiral Rib Metal Pipe: The pipe shall be fabricated from flat sheets in coils. The base metal, spelter coating, method of sampling, accepted brands of metal, inspection and rejection, shall meet the requirements of AASHTO M-36. Structures furnished shall be full circle on sizes of 18 inch and above as shown in Table 4 of AASHTO M-36. The pipe shall be fabricated with helical rectangular ribs projecting outwardly from the pipe wall with a continuous lock seam extending from end to end of each length of pipe. Spiral Rib Pipe shall consist of two rectangular ribs and one half-circle rib equally spaced between seams. Rectangular ribs shall be ¾ inch wide by 1 inch high. The half-circle rib diameter shall be ½ inch and shall be midway between the rectangular ribs. Maximum rectangular rib spacing shall be 11½ inches. The thickness (gage) of the metal shall be in accordance with project plans and/or specifications or as otherwise specified.

760.4 COUPLING BANDS:

Watertight joints shall be fabricated for corrugated metal pipe by the use of galvanized couplers or connecting bands, bituminous coated where required, with each band overlapping by at least 2 inches. Corrugated coupling bands shall be constructed and connected as specified in AASHTO M-36, except as otherwise required herein. The couplers or bands shall be manufactured of material 2 gages lighter than the gage specified for the pipe material, shall have corrugations or dimples to match the pipe corrugations or end treatment or may be flat, and shall be fastened with bolts. Dimpled coupling bands shall be 10½ inches wide for diameters 12 through 60 inches, and 17 inches wide for diameters above 60 through 96 inches. The 10½ inch wide bands shall have 2 rows of dimples of not less than 7 dimples per row, and the 17 inch wide bands shall have 4 rows of dimples of not less

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